WESTERN NATURE STUDIES

By J. H. PAUL.

OTHER LILIES OF THE ROCKY MOUNTAINS.

Professor Northrup, horticulturist at the Agricultural college, spoke before the writer's classes in nature study this week. He showed the students just how to raise plants in window boxes and small hotbeds, what plants to undertake the management of in the school room and school garden. It is not possible in this issue to give a fair outline of his lecture. Only a few points for the benefit of belated amateur gardeners can be presented. Other matters of interest treated in Professor Northrup's address were referred to in a previous article.

Germination of Seeds.

The germination of seeds depends upon a proper degree of heat, moisture and air (oxygen). All three of these conditions must be present, in normal proportions with each other, in order to insure the best germination of seed.

Some seeds germinate best under a maximum degree of heat (80 to 90 degrees F.), while others do best at a low temperature (40 to 60 degrees F.).

For most seeds, however, a soil temperature a few degrees higher than that of surrounding air is desirable. A soil temperature of from 65 to 70 degrees F. for an air temperature of 60 degrees will prove very satisfactory for the germination of most seeds.

It will be difficult to secure these conditions, however, without artificial means, such as a greenhouse, hotbed or cold frame. Nature maintains approximately these conditions during the early part of the growing season.

The old-fashioned plan of raising the flower or vegetable beds is fast going out of style. The raised bed must be tended by hand, and it dries out too fast in dry weather. Make all beds level with the surface of the ground to save moisture and make the work of tending them easier.

It is best to start beets cabbage, lettuce, tomatoes, celery, peppers, eggplant, early asters, candytuft, dahlia and canna seeds and snapdragon in the hotbed. Transplant them to a cold frame for hardening them and promoting a sturdy root system. Much time in early maturity of the plants may be gained in this way of handling.

Time to Plant.

This season has been quite backward, but practically all seeds except melons, squash and corn are now being planted. Planting may be done earlier in a dry spring than in a wet spring. Owing to the cooling due to evaporation of water at the surface, wet soils are colder than dry soils. Many seeds planted in cold, wet soil will rot and not germinate. Hence, it is usually best to delay the planting of tender seeds till the soil becomes thoroughly warm and all danger of frost is past. Some garden seeds are perfectly hardy and are capable of enduring almost any amount of cold and dampness in the soil without injury. The young plants from these hardy seeds are also able to withstand adverse soil and weather conditions. Some of them can stand tolerably heavy frosts without apparent injury.

Among hardy seeds are cosmos, canna, sweet pea, vegetable pea, lettuce, onion, asparagus and radish. Asparagus seeds do not sprout till about six weeks after planting, and by the time young plants appear all danger of frost has passed.

The very hardiest seeds for the very earliest planting are sweet peas, lettuce and vegetable peas. Of these the sweet flowering peas should be planted first. No amount of cold or moisture in the soil will injure them in the least. The roots of the growing plants revel in cool earth, and this condition must be furnished for them to do their best during the summer.

Sweet peas should be planted as early as March, in central latitudes, as they can be gotten into the ground. Dig a trench about a foot deep, fill in the bottom of this two or three inches of manure, fill on the manure about two inches of soil, and on this soil about another inch of manure. Cover this manure with about an inch of fine soil, and plant the seeds on it, covering them about two inches deep. For fertilizer for sweet peas trench we use manure from the cow stable or that from a last year's hotbed. The object of mixing successive layers of manure and soil is to prevent heavy soil from packing under beating rains, and to afford abundant nourishment to the roots of the growing plants.

They can still be put in to good advantage, but will be late in flowering.

Vegetable garden peas may be planted in the same manner as sweet peas, or they may be planted in common drills in rich, loose loam. However, to prevent packing of the soil, it is almost always best to sprinkle a little fine manure in the rows. Decaying organic matter provides soil warmth for early growing seeds, and excess of heat is absorbed by the cold, moist soil, which will prevent burning of the roots unless the soil should become too dry.

The lettuce bed or row should be made extremely fertile for the promotion of rapid growth, upon which depends crispness and mild flavor of the leaves. In addition to heavy applications of stable manure, dissolved or ground poultry droppings may be used, together with a fair proportion of wood ashes. Prepare the soil for lettuce in a dry state and make it as fine as possible, since the seed are small. Cover them about half an inch deep with the finest of soil, and over the soil covering may be sifted a light dressing of fine manure.

Utah's State Flower.

In order to complete the chapter begun last week on Rocky mountain lilies, we shall now consider two other well known and interesting forms.

In the writer's boyhood days, sego digging was a favorite springtime occupation for boys and girls. The pioneers had learned from the Indians that the bulb at the root of the white and purple lily which the Indians called the sego, is in early spring a choice and nutritious article of food. The name was always pronounced "see-go," not "say-go," as some have been inclined of late to rename it. The word sego is probably of Indian and not of Spanish origin, so that the long e does not take the sound of long a. Besides, sago is the name of the flour from the sago palm, and is an article used in making sago puddings. It will only make confusion to spoil the name of the sego lily by calling it saygo.

The Sweet Bulb.

For those who wish to taste the bulb of the sego, which served in some cases in early days to avert actual famine, we may state that the bulb of this delicate lily, Utah's state flower, is now at its best as a toothsome and dainty morsel. The plant grows on every sagebrush hill. It may be known from its slender, grass-like stem and leaves, at this season, resembling a bluish wiregrass, about six inches high, and consisting usually of only two leaves.

It may finally grow to twelve inches. It always bears only a few, usually three, linear leaves, which clasp the stem at the base. The lower leaves are alternate, but later there is an upper, small, opposite pair. From these arise two main branches each bearing a flower. Occasionally there are three or four flowers, or only one.

The Artistic Flowers.

The flowers usually appear about the beginning of summer. When fully expanded, they are bell-shaped, symmetrical in outline, and are white, striped with mottled green and tinged with purple on the outside. Within, the color is pearly white marked with purple above and yellow below in a large bearded and spongy spot near the base. The flower measures about an inch and a half each way. The three petals are heart-shaped, but each has a small point above. The three sepals are lance-shaped, tapering, sharp-pointed, and finally spreading outwards. The heart, the lance, the arrow—Cupid's paraphernalia—all appear in its make-up.

Three-fold in Plan.

The bud from which the flower expands is also an interesting object. It is cone-shaped and tapering, finally becoming nearly an inch long. Its sepals, or outer flower leaves, are somewhat imbricated, the edges very slightly overlapping; but the petals, the inside flower leaves, are convolute or rolled about each other in the bud. These six flower leaves form the perianth, or flower divisions, and opposite each segment is a stamen with a blunt, arrow-like anther. The pistil is three-celled, narrowly oblong, and several to many seeded. It is a question whether or not the sego is reproduced from seeds or whether it arises always from the little bulbs that form at the roots after the flowering is over. Some of these small bulbs may have been formed from the seeds of previous years, but some, at least, are renewed from the old root.

Delicate in Its Beauty.

On account of its rare and delicate beauty, its fragrance, and the entire absence from this choice species, of any aspect of weediness, it seems a pity that it has never been successfully domesticated. It is literally all flower, and has no weed-like remainder after blooming.

The thread-like stem, white and glistening beneath its papery underground coat, goes into the soil about six inches or more, and there expands into a tender scaly bulb, which is sweet, mucilaginous and nutritious before the plant flowers; but after flowering is dry and tasteless. This bulb is usually about three-fourths of an inch long and less than half an inch wide.

The Poison Sego.

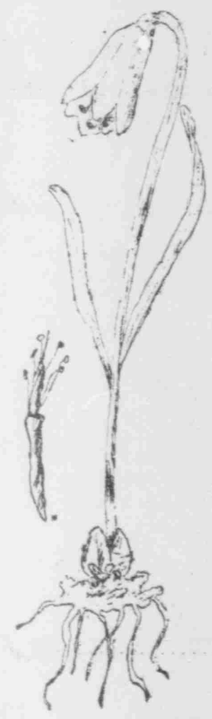
The edible bulb of the sego lily, Calochortus, need never be confused with the poisonous one of the so-called "poison sego," Zygadenus paniculatus, which is much larger, coarser, and covered with several rough, black, scaly coats. Zygadenus is a much larger plant, its bunch of numerous two-ranked or folding leaves rising like a fountain and spreading outward in sickle-like curves to the ground. This dense and deep green foliage of sickle-curved leaves finally becomes a foot high, and need never be mistaken for the two or three slender leaves of the sego; yet the two have often been confounded when young, and cases of poisoning were reported in early days from eating the bulbs of Zygadenus. These bulbs contain an albumoid poison that is exceedingly dangerous if eaten. The writer sent specimens to a botanist, Dr. Eccles of Brooklyn, who had the bulbs analyzed. Enough poison was found in one large bulb to kill a grown man. It is said, too, but I do not know that this has been verified, that the leaves are poisonous and are sparingly eaten by cattle, which are sometimes poisoned in this way. The scaly bulb of the poison sego is black outside, and when full grown is an inch and a half thick and two inches long. A dense fibrous root system springs from below the bulb. The flowers of the poison sego are individually small and form a mass aggregated into a spike cluster of greenish white flowers, the six yellow anthers giving to the flowers a yellowish cast.

Both the state flower and its poisonous relative belong to the family of lilies, but are of different genera. They grow side by side, the sego lily often preferring the rich soil and shaggy shelter of the sagebrush, while Zygadenus prefers the open. They are like types of good and evil, of beauty and beast, of virtue and vice, flourishing in the same environment.

A Study of Zygadenus.

A year ago pupils of the third grade in the state normal training school took a lesson on the wild onion, another lily, or flower in threes, and also on the poison sego (Zegadenus), though the beautiful golden lilies, Erythronium and Frittilaria, already mentioned, or the state flower, the sego, would have been easier. The third-graders discovered the following points about the poison sego: (1) that its most striking feature is a fountain of sickle-shaped, folded, shining green leaves; (2) that the main stem, a foot high, bears a long, narrow cluster (panicle) of greenish white flowers and a few half-clasping, half-papery leaves; (3) that the anthers give a yellowish color to the flowers; (4) that the flower leaves, the calyx and corolla, are six-parted, star-shaped, and spreading, the divisions broadly egg-shaped (ovate); (5) that the stamens are six in number, the anthers two-celled, opening lengthwise to shed their yellow pollen, and fixed by the center on slender stalks (filaments); (6) that the styles are three, thin and awl-shaped; (7) that the pistil, or fruit pod, is definitely three-united, and many seeded, the seeds small; (8) that the lower flowers are in groups of from six to twelve on short stalks (pedicels); the upper, single on larger stalks (peduncles); (9) that the leaves are folded (equitant) and parallel veined; (10) that the flower stalk is a round, brittle, filled cylinder; (11) that the lowest leaves arise from scales which form an underground, upright stem; (12) that this stem ends below in a coarse, scaly, onion-like bulb, 1½ inches thick and two inches long, covered with black layers on the inside, but pearly white within, and very poisonous if eaten; (incidents of poisoning were related here); (13) that the true roots beneath the bulb are fibrous; (14) that the plant is a lily, being in threes, and therefore a third grade study, with leaves imitating those of the blue flag, and a bulb imitating that of the sweet and edible sego lily; (15) that the leaves are sparingly eaten by cattle and sheep, which are sometimes poisoned thereby.

If any teacher thinks this too heavy a lesson for third graders, let a trial be made using the sego lily or the golden lily, and the apparent difficulties will vanish. The botanical terms in parenthesis need not be used, though they give no trouble whatever, whenever it is convenient to employ them.



Fritillaria pudica, the snowdrop, or Utah yellow rice root, one of the golden lilies now blooming in our canyons. This is the species that was described at length in the previous article. The stem grows from three to eight inches high, rises from a flattened bulb (corm), and bears from one to six flowers. The leaves are from two to four inches long; the flowers deep yellow and shaped like bells. The cut shows the rice-like bulblets forming on the base of the old one; and at the left the flower with the petals and sepals (perianth) removed. Drawings by pupils of the training school.

SYNOPSIS OF THE ANNUAL STATEment for the year ending December 31, 1908, of the condition of the

Fidelity Fire Insurance Company.

The name and location of the company—Fidelity Fire Insurance Company, New York, N. Y. Name of President, Henry Evans. Name of Secretaries, J. E. Lopez and E. L. Ballard.	
The amount of its capital stock is	$ 1,000,000.00
The amount of its capital stock paid up is	1,000,000.00
The amount of its assets is	2,432,282.71
The amount of its liabilities (including capital) is	1,872,612.90
The amount of its income during the preceding calendar year	1,761,872.23
The amount of its expenditures during the preceding calendar year	839,054.70
The amount of losses paid during the preceding calendar year	450,264.91
The amount of risks written during the year	106,895,435.00
The amount of risks in force at the end of the year	121,858,284.00

State of Utah, Office of the Commissioner of Insurance.—ss.

I, GEORGE B. SQUIRES, commissioner of insurance of the state of Utah, do hereby certify that the above named insurance company has filed in my office a detailed statement of its condition, from which the foregoing statement has been prepared, and that the said company has in all other respects complied with the laws of the state relating to insurance.

In testimony whereof, I have hereunto set my hand and affixed the seal of the insurance department this 14th day of April, A. D. 1909.

(Seal) GEORGE B. SQUIRES, Commissioner.